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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/552,383 | 04/19/2000 | Stephen L. Willis | MICRON.092CP1 | 3147 |

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EXAMINER

DIAZ, JOSE R

ART UNIT PAPER NUMBER

2815

DATE MAILED: 05/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/552,383

Applicant(s)

WILLIS, STEPHEN L.

Examiner

José R Díaz

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 February 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 30-37 and 56-62 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 30-37 and 56-62 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

➤ A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 11, 2003 has been entered.

Claim Rejections - 35 USC § 103

➤ The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

➤ Claims 30-37 and 56-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shue (US Pat. No. 6,281,127 B1) in view of Sandhu et al. (US Pat. No. 5,069,002).

Claims 30-32 and 56-58, Shue teaches a method of forming a dielectric layer (1) of a first thickness on a semiconductor wafer (see Fig. 1) comprising: forming the dielectric layer (1) on the wafer (see Fig. 1); positioning a shield layer (3); positioning a sacrificial layer (5); depositing conductive material (6a); removing the conductive material and the sacrificial layer using a CMP process adapted to remove the

conductive material and the sacrificial layer until the shield layer is reached (see Fig. 3), wherein the shield layer is more resistant to planarization by the CMP process than the sacrificial layer, and wherein the shield layer inhibits thinning of the dielectric layer during the CMP process, and wherein interposing the sacrificial layer between the conductive material and the conductive material and the shield layer reduces the amount of conductive material on the shield layer following the CMP process (see Fig. 3 and col. 4, lines 1-46).

However, Shue is silence with respect to the limitation of detecting when the CMP process has removed the sacrificial layer. Sandhu et al. teach that is well known in the art to perform a sensing step during the CMP process, in which the change in friction is detected by rotating the wafer and polishing surfaces with electric motors and measuring current changes on one or both of the motors (see abstract and col. 3, lines 38-41 and 55-63 and col. 4, lines 28-30). Therefore, it would have been obvious to one having ordinary skill in the art at the same time the invention was made to modify Shue to include a sensing or detecting step during the CMP process, in which the change in friction is detected by rotating the wafer and polishing surface with electric motors and measuring current changes on one or both of the motors. The ordinary artisan would have been motivated to modify Shue in the manner described above for at least the purpose of producing a signal to operate control means for adjusting or stopping the process.

Regarding claims 33 and 59, Shue teaches that the step of forming the shield layer (3) comprises the step of forming a DARC layer (see col. 3, lines 30-32) on the dielectric layer (1) comprised of a BPSG material (see col. 3, lines 25-26).

Regarding claim 34, Shue teaches that the CMP process is performed using an etchant selected to remove the sacrificial layer (5) and wherein the shield layer (3) is selected to be resistant to the selected etchant (see Fig. 3 and col. 4, lines 1-46).

Regarding claims 35 and 60, Shue teaches that the shield layer (3) is an insulator comprised of, for example, a material other than silicon oxide positioned on the dielectric layer (1) (see Fig. 1 and col. 3, lines 30-32).

Regarding claims 36 and 61, Shue further teaches a sacrificial layer comprised of the layer (5) and a BPSG layer (8) formed over the shield layer (3) (see Fig. 6).

Regarding claims 37 and 62, Shue teaches a cavity (4) filled with the conductive material (6a) (see Figs. 2 and 6).

Response to Arguments

➤ Applicant's arguments with respect to claims 30-37 and 56-62 have been considered but are moot in view of the new ground(s) of rejection.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R Díaz whose telephone number is (703) 308-6078. The examiner can normally be reached on 9:00-5:00 Monday, Tuesday, Thursday and Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 746-3891 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JRD
April 29, 2003

A handwritten signature in black ink, appearing to be 'Eddie Lee', written in a cursive style.

EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800